Soil Conservation

January 1980

U.S. Department of Agriculture

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Today's Challenge in Land Use

From the Administrator

Land use patterns in the United States have generally been determined not by careful planning, but by marketplace and some political bargaining. The result has too often been exploitive and shortsighted use of the Nation's best agricultural land.

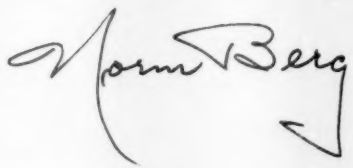
Citizens need to understand the unique character and value of land, which differentiate it from manufactured, expendable products. Land should not be "lumped" with these products and traded as just another commodity. It is an essential, irreplaceable resource crucial to man's survival.

A solution to the wasteful patterns in land use can best be achieved through the use of well prepared, publicly supported land use plans, within the coordinated framework of comprehensive national, State, and local goals and guidelines.

Rural and urban America are interwoven parts of the American fabric. We must strengthen our rural areas as we rejuvenate our major cities, in order to provide an equally attractive choice between urban and rural lifestyles.

The issue is not to "lock up" all development on agricultural lands, or to "stop growth," but to ask ourselves: How can urban development be guided in a pattern that will be responsive to the needs of the urban dweller and also protect our prime farmlands from permanent loss?

The task ahead is not an easy one. It will require the best efforts of both urban and rural citizens. All Americans must assume stewardship of their land for their immediate interest as well as for future generations.



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Front cover:
Good land use planning balances land use requirements with land capability. This Pennsylvania community is compact and well defined, surrounded by agriculture that is free of urban sprawl, with steep slopes in trees and level or gently sloping acres in cropland.

Back cover:
Current trends in land use planning raise many questions. For example, when industry locates in farmland area, have alternative sites on less productive land been explored? Is the industry layout efficiently designed, or does it take up more land than necessary? (See article beginning on page 4.)

Disappearing Farmland: A National Concern

"The U.S. is losing one million acres of the world's best and flattest agricultural land each year to urban sprawl. In my lifetime, we've paved over the equivalent of all the cropland in Ohio. Before this century is out, we will pave over an area the size of Indiana."—Bob Bergland, Secretary of Agriculture.

"Planning to preserve . . . prime farmland is of the utmost importance, simply because feeding our people is land's most important use. . . . But what are we doing? Every day, we're losing thousands of acres of this prime farmland to subdivision, highways, airports. We're burying it under concrete or houses, and it can't be jackhammered clear again."—Orville Freeman, former Secretary of Agriculture.

"Good farm land is precious. It's what this country is built upon. And once prime land is lost, you don't go to the supermarket and buy a square foot of it."—Phillip Alampi, Secretary, New Jersey Department of Agriculture.

"It may now be asserted that for the first time in this Nation's history, each new subdivision, highway, dam, factory, power plant, or shopping center threatens permanently to reduce the productive capacity of American agriculture."—Charles Little, President, American Land Forum.

Introduction

There's a lot of talk about "prime farmland" these days, and much confusion over how important it is and what to do about the fact that we're losing it.

In their national farmland inventory, begun in 1975, the U.S. Department of Agriculture (USDA) Soil Conservation Service provides a definition for prime farmland under the umbrella term of "Important Farmlands." Important Farmlands is a general description of lands that include prime farmland and unique farmland, as defined by SCS, and other important farmlands, as defined by State and local governments.

Prime farmland is, by national standards, the best land for farming. Its flat or gently rolling acres have little or no erosion problem. In addition, prime land's soil quality, growing season, and moisture supply assure high production of food and fiber at a minimum cost.

Prime farmland is also the easiest and least costly land to build homes and businesses on. Because of this, government officials at all levels are concerned over whether U.S. farms can retain the acreage to sustain their current growth in productivity.

As our Nation expands its urban areas, it is frequently these valuable acres that are used for highways, housing, shopping centers, recreation, airports, and industry. During the last decade, America's agricultural lands have been disappearing at the rate of nearly 3 million acres per year. Scattered development by "leapfrogging" and "buckshot urbanization" breaks up and isolates additional land.

Another way to view the problem: About 90 percent of America's Important Farmlands is currently in production. This fact suggests two thoughts:

by Darwyn Briggs
and Enid Yurman

One, if our best farmlands are being converted to other uses, food and fiber production must be shifted to less productive lands. This results in decreased production per acre, increased energy and farm machinery needs, and higher prices for commodities.

Two, the fact that we have only 10 percent of our farmland in reserve reminds us that the United States is approaching the limit of its cropland "frontier." Our Nation's population is growing at the rate of 1.7 million people per year. What happens when we reach the end of that frontier?

Loss of farmland also has adverse environmental effects beyond the loss of crop-producing capacity. Open lands, including farmlands, help maintain local water supplies by absorbing precipitation and transferring it to the ground water system. They also protect watersheds by retarding stormwater runoff and decreasing sediment damage.

American Land Use in the Past

During the past 50 years, as rural America has been emptying itself into the faster-paced cities and towns, people's values have changed. Many have forgotten that the United States prospered because of the richness of its farmland. Some people are also unaware that agriculture is still the economic backbone of this country—agricultural products provide the principal means by which to combat an ever-increasing foreign trade deficit.

The American attitude on land use policy has come a full 180 degrees. From the first settlements to the early 1900's, everyone agreed: fill it up, connect it, and use it up. And why not? In those days, our Nation's horizons seemed endless.

But by the early 1930's, it was obvious to everyone that our natural resources were finite. Americans were using up the land at an alarming rate, and American farms paid the price.

Without understanding the consequences of soil erosion, farmers abused their lands. Faced with an unusual succession of severe droughts, many Great Plains farms fell victim to the tragic Dust Bowl of the "dirty thirties."

A Wisconsin farmer (top photo) prepares a seedbed for planting corn in alternate strips with alfalfa. The beginnings of urban development can be seen in the background. Ten years later (bottom photo), the farm has completely disappeared—only the buildings remain.

"In the end, the farmland issue will have to be related back to our ability to feed ourselves and our neighbors. . . . . The time for careful review of impacts and alternatives in many areas of public policy that touch land use is right now. The time for more informed land use decisions also is right now."—Norman Berg, Administrator, Soil Conservation Service.

In addition to the often devastating results of poor farming practices, economic factors compounded the effects of the depression on rural America. American farming was plagued by crop failures, low prices, inequities in taxation and credit policies, and shrinking rural job opportunities. Many farmers, defeated by these problems, lost their farms and began migrating to the cities and towns to make a living.

The above-stated problems to some degree have followed Americans to the present day. U.S. farms today must feed a greater number of people than in the past. However, the total land area under cultivation, as well as land readily available for farming, is declining. USDA and the President's Council on Environmental Quality (CEQ), alarmed by these trends, have launched a major study on how to prevent further farmland losses. This study, described below, is titled, "National Agricultural Lands Study" (NALS).

National Agricultural Lands Study

The National Agricultural Lands Study (NALS) is an 18-month study of the problems caused by conversion of agricultural land to other uses. Under the direction of Secretary Bob Bergland (USDA) and Chairperson Gus Speth (CEQ), NALS is being conducted by 11 Federal departments and agencies whose programs and actions most frequently affect agricultural lands. An interagency staff has been assembled from the participating agencies and is well into the study.

The purpose of this study is to:

- Determine the nature, rate, extent, and cause of losses of U.S. agricultural land;
- Evaluate economic, environmental, and social consequences of the losses; and
- Recommend administrative and legislative actions, if found necessary, to reduce these losses.

Between October 31 and December 12, 1979, NALS conducted 17 public workshops around the Nation. Secretary Bergland said the NALS staff was ". . . seeking information from individual citizens, public interest groups, and State and local governments on the availability of agricultural lands." Workshop participants shared their experiences and viewpoints on problems stemming from increased competition for, or actual conversion of, agricultural lands; values threatened by these changes; and ways to avoid or mitigate the most important problems cited.

NALS will submit a report to the President in January 1981. This report will provide a detailed analysis of the primary issues of the study, describe the results of the 17 public workshops, and include any recommended administrative or legislative changes needed to reduce the loss of productive agricultural lands to other uses.

Highway construction consumes a considerable amount of land—an interchange may use as much as 80 acres—and often breaks up a farm, making it difficult to move farm equipment from one field to another. In such a situation, a farmer might have to reorganize the farming system and reestablish conservation practices.

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Ms. Yurman is assistant editor, *Soil Conservation*, SCS, Washington, D.C.

Primary Issues of the National Agricultural Lands Study

The NALS is focusing upon seven primary areas of investigation:

1. Agricultural Lands in National and International Perspective. America's agricultural land base is a major domestic resource of great value to our economic and national security. It is also a resource on which the entire world is becoming increasingly dependent. This study will describe and quantify the domestic and international contributions derived from U.S. agricultural land.

2. America's Agricultural Land Base. A thorough assessment will be made of existing inventories and studies on agricultural resources. This information will provide baseline data describing the amount of land suitable for, and available to, agriculture.

3. Demands on Agricultural Land. Various categories of demands for land will be defined along with the degree to which they compete with agricultural uses. Recent shifts in land use will be identified along with indicators of possible future trends.

4. The Allocation of Agricultural Lands Among Competing Demands. Land that is well suited for agricultural use is often equally well suited for other land uses. How the land is used, and who owns it, is determined by a variety of allocation processes. This section addresses the fundamental issue of whether these processes allocate agricultural land among competing uses in a satisfactory manner.

5. State and Local Actions Affecting Agricultural Land Availability. Most State, county, and local communities have initiated programs to stop the conversion of agricultural land to other uses. These programs include many different approacnes, such as: zoning, purchase of agricultural easements, and various tax assessments and tax differential schemes. This study will analyze the effectiveness of these programs in terms of overall costs, administrative problems, political considerations, and landowner equity. The results will be presented in a handbook designed for use by State and local officials.

6. Impacts of Federal Programs and Policies on Agricultural Land Availability. The Federal government, with its numerous programs and policies, has a significant impact on agricultural land. For example, federally assisted highway projects, water resource development, sewage treatment facilities, and other public works projects often contribute to the conversion of agricultural land. In addition, Federal tax policies affect agricultural land use. This study will analyze the major impacts of Federal legislation and regulation on the availability of agricultural land.

7. Consequences for the Infrastructure of U.S. Agriculture. In the conversion of farmland to other uses, there are often spillover effects for nearby farms and agricultural support services, as well as social, economic, and lifestyle changes for nearby rural communities. These spillover effects can magnify the impacts of land conversion. Analyses will be made of the consequences for the infrastructure of U.S. agriculture.

Conservation Dollars and Sense

by John M. Cross

"Conservation doesn't cost—it pays!" read a slogan promoting better land use and treatment in the 1930's and 40's. But based on today's economics, it warrants a second look.

There was a time when a good conservation job, particularly on eroding cropland, would always boost yields and profits, especially on whole-field averages. You could cut production costs substantially through fuel savings by planting on the contour, for example. And you still can.

But inflation has caught up with conservation, too. Moving soil, pouring concrete, and hiring labor for conservation work can run into money. Yet, some conservation practices still cost very little and do, in fact, boost per-acre yields.

And then there's the big question—what does it cost to *not* do a good conservation job? Can we afford it? The answer is alarming.

Specialists in the Soil Conservation Service's Midwest Technical Service Center at Lincoln, Nebr., have been studying conservation costs and returns. They have gathered data from each of the 12 States served by the center: Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin.

In South Dakota, for example, data indicate that growing dryland corn on sloping land results in a soil loss of more than 5 tons per acre each year. If the land was terraced, the average cost over a 10-year period would be $6 an acre. Deducted from a net return (income over production costs) of about $32 an acre, this means that the cost of the terraces would eat up about 20 percent of the profits for 10 years. But then, what price can you put on a ton of topsoil? How much would soil productivity and thus profits decrease over the long haul if you didn't reduce soil losses?

Or, look at an alternative conservation practice. Installing stripcropping without terraces, alternating sod strips of oats or alfalfa with corn, yields a net return of $43 an acre. But the cost of installing the conservation practice is only $2.60 an acre. Soil loss is the same with both terraces and stripcropping so the decision rests on whether or not a farmer can use alfalfa in his or her farm operation.

For many kinds of conservation work, the decision is whether to keep farming the land at a low net return or to invest in land treatment to protect productivity. For example, on a 40-acre field of poorly drained bottomland that yields only 40 bushels of corn or 30 bushels of oats, net returns would be nonexistent. Tile drainage with a main outlet would cost $75 an acre annually, but yields should average 150 bushels and you

Conservation tillage costs very little and the crop residues it leaves on the land provide some of the best protection from erosion. The practice also saves fuel because it requires fewer trips across the field than conventional tillage.

could grow corn every year. Deducting the cost of drainage over a 25-year period, the net return would reach about $75 an acre per year. Thus the land would come into full agricultural production at a lower cost per bushel.

Other effective conservation practices cost very little to install. Conservation tillage is one of these. In Ohio, SCS economists figured corn planted the conventional way and yielding 110 bushels an acre returns a net profit of $65 per acre. If the land is chisel plowed and planted, the return would increase to $68. No-till methods would boost the figure to $78. The difference in profits comes from reducing machinery requirements and from fuel savings that result from fewer trips across the field.

But that isn't the whole story, and here's where conservation begins to make more sense than it costs in dollars. Crop residue left on the land by conservation tillage methods is among the best erosion fighters. On an area of silt loam in Ohio, for example, 3,000 pounds of corn or sorghum residue per acre on the surface could put soil loss at about 2 tons per acre, which is considered tolerable. But twice that amount on the same land could reduce soil loss almost to zero. That's a target to shoot for, and the conservation practice doesn't cost a cent.

Out West, range management costs very little but pays big dividends. Once the fences and watering facilities are in, it costs practically nothing to open and close the gates to insure even grazing. Installing fences and watering facilities to make the systems work costs $1 an acre for a section of land in Nebraska, if you spread the costs over a 20-year period. Proper grazing of the range means more beef cattle per acre over a longer period, and boosts income by about $2.40 an acre a year. On the other side of the coin, if grass gets too short from overgrazing, the wind will whip away sandy soils in a single season.

Then there is the other extreme to the conservation cost story. Some practices run high in cost. For example, to build a set of grass backslope terraces with tile outlets on sloping Iowa land costs about $300 an acre. It costs $500 an acre to put in a grassed waterway instead of the tile. Farm ponds cost about $1,500 and up. A grade stabilization structure to halt a creeping gully may cost as much as $3,500. But if you figure how much money you save an acre in profits by protecting soil productivity and spread the conservation costs over a 20-year period, it doesn't sound so bad.

Conservationists in Iowa estimate that straight-row corn farming on sloping land results in a loss of about 2 bushels of topsoil for every bushel of

At left, planned grazing systems return more than they cost. Proper range management not only protects the soil by preventing overgrazing but also helps insure the continued productivity of pasture and rangeland. At right, grass backslope terraces with tile outlets can cost about $300 an acre. It's an expensive practice, but it would cost more in tremendous soil losses to leave sloping land unprotected.

corn produced. Yields have been sustained in recent years only by adding more fertilizer or using new seed strains. Some experts predict we have reached a summit, a point where yields can no longer be increased much with present technology. Soil losses, if they continue, will trigger a downward trend in yields.

Erosion is dumping 200 million tons of sediment into Iowa's lakes and streams each year. In helping to clean up the country's waterways, the conservation effort has taken on new dimensions. Today's generation of landowners consider costs for land treatment to insure clean water worthwhile even though it doesn't always result in increased profits.

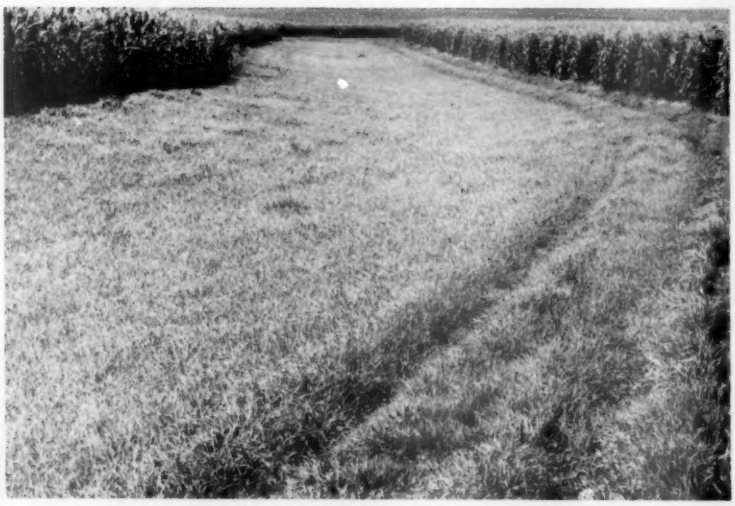
Unprotected soil results in erosion; erosion produces sediment; sediment is, by volume, the country's worst water pollutant. The protection and improvement of water quality have become important factors in figuring the costs and returns of conservation. How much is clean water worth to us? How much less would it cost to keep sediment out of the streams than to clean them up after they are polluted? This takes us back to the basic question: What is the cost of *not* practicing conservation?

The University of Missouri has estimated that corn yields average about 16 bushels an acre less on moderately eroded soils and 25 bushels an acre less on severely eroded soils than on comparable soils with little or no erosion. These figures can be translated into direct costs of doing nothing to prevent erosion.

All of this brings up still another question: Who should pay the costs of conservation? Traditional approaches hold that society stands to gain as much from sound resource management as an individual. That is the theory behind government cost-sharing programs. No one seems to have come up with a better solution if, indeed, there is one.

In the light of today's economics and today's values, maybe we should rewrite the old slogan to read: "Conservation investment pays big dividends." It pays dividends in crop yields now and in protected soil productivity for the future.

Mr. Cross was head, information staff, Midwest Technical Service Center, SCS, Lincoln, Nebr., and is now retired.



Grassed waterways filter runoff, protecting water quality in rivers, streams, and lakes.

Small Family Farm Is a Way of Life

by Morris S. Gillespie

Working a small family farm is the "good life," according to Harvey McElroy of Cherokee County, Ala. Although it is a lot of hard work, he claims it is the best place to raise children.

"I was raised on this land and have farmed it since I was a boy," said McElroy. "My wife Cornelia and I have raised nine children here, and there are now four generations of McElroys in the county." McElroy's farm totals 60 acres. On a 20-acre plot he raises crops and hogs and has the family house, and on 40 acres a mile away he raises corn and soybeans.

McElroy was looking to the future as well as at the present when he built parallel terraces on 11 acres of sloping cropland. "I put in the terraces to make sure that this land remains productive for the McElroys yet to come," he said. "You see, I've got some of the best soil in the area, and I aim to keep it that way."

Not only will McElroy's parallel terraces keep his well-drained sandy loam soil from eroding, but his whole operation will be more efficient. "The gradient terraces I had before were hard to maintain," said McElroy. "Every time it rained, the water would break over them, washing away my soil and depositing sand bars. I wanted parallel terraces to protect my land and to give me long rows to farm."

McElroy was not alone in his efforts. He received technical help from the Soil Conservation Service. "We designed and laid out McElroy's terrace system, and then he built the terraces himself with his tractor," said Don Webster, SCS district conservationist in Centre. USDA's Agricultural Stabilization and Conservation Service shared the cost.

McElroy grows 20 acres of corn each year for his hogs. He keeps about 25 sows and feeds out the pigs to about 60 pounds. "I don't make much money on the hogs; but it gives me something to do, and I enjoy the work," said McElroy. "Years ago, one of my boys asked me when I was going out of the hog business. I told him, 'When you grow up!' I kept the pigs to help teach my children how to work. So many children today don't have a chance to work, so they don't know how to do anything. When my children were growing up, they hoed weeds out of the crops, picked cotton, and gathered corn by hand. We all worked together.

"And all that hard work has paid off. My four sons are in the contracting business. They're building farm ponds, terraces, and installing other conservation practices throughout the county. But, they still help me when I need them. As a matter of fact, they're the ones who smoothed out my old gradient terraces."

With his grandson, Joe, by his side, McElroy reflected about the plight of small family farms: "I'm really proud of the way my family has turned out, and I can't help but believe that they're happy and successful because of the things they learned out here on the farm. And, though many other small family farms are being gobbled up, we'll be raising hogs, corn, and McElroys on this farm for some time to come."

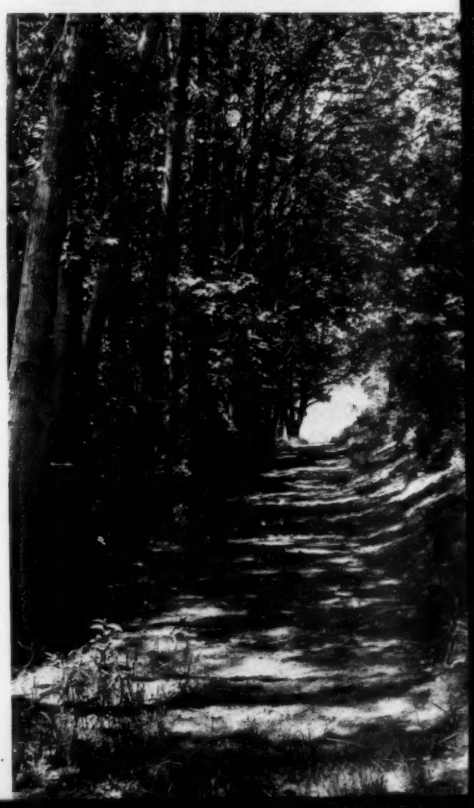
Mr. Gillespie is public information officer, SCS, Auburn, Ala.

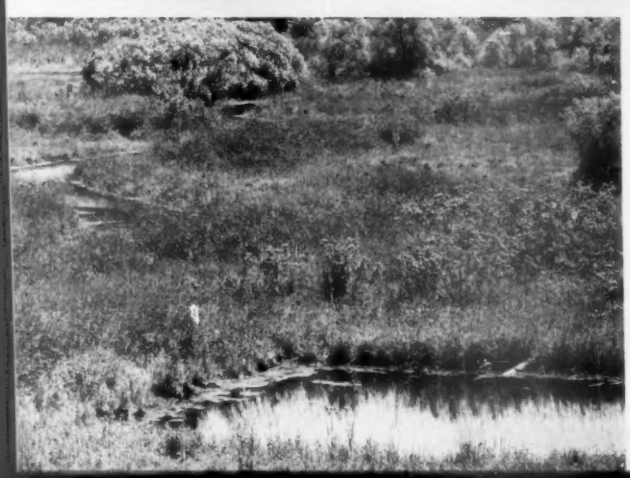
Jason McElroy (left) discusses terrace construction with SCS District Conservationist Don Webster. Jason's father, Harvey (on tractor), a cooperator with the Cherokee County Soil and Water Conservation District, built the parallel terraces with his farm tractor.

A Special Place

1
Most of us, from time to time, dream of our own special place, where we can just sit back and listen to Nature's music—the singing of birds and windsong in tall grass.

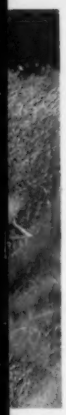
People in the town of Van Etten in Chemung County, N.Y., discovered just such a special place. The people felt strongly that their local marsh was a unique and valuable resource. So, they embarked on a program of improvements designed to make the marsh more attractive to wildlife and at the same time increase opportunities for public enjoyment of the area.



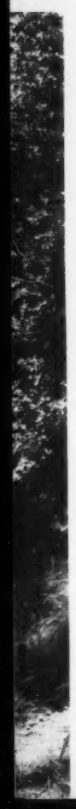


2
Water levels in the marsh varied sharply from season to season, and the area was without surface water most of the summer. To provide year-round open water for fish and waterfowl, the Soil Conservation Service designed a system of level ditches and potholes.

by Karen Rusinski



3
To provide nesting areas for the wood-duck population, the town installed 10 nesting boxes. Sixty loafing logs were also placed to encourage wildlife usage of the marsh.



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The New York State Department of Transportation built a parking lot for visitors to the marsh. Comprehensive Education and Training Act employees built an access stairway and nature trail so that people could enjoy the marsh and adjacent upland without disturbing wildlife and damaging its habitat.

5
Financial support for the marsh project was important to its success, with the local Federation of Sportsmen's Clubs donating $2,000. But, local feeling for the marsh is the real story.

A few years back, stories were told of a "swamp monster" in the marsh whose strange cries could be heard at night. The monster even reportedly killed a goat on a neighboring farm. When skeptics claimed that the monster was a hoax, a sign was posted that read, "Save the Swamp Monster."

Whether or not the tall grasses of Van Etten marsh shelter a swamp monster is subject to debate, but for the people of the town their marsh is a special place.

Recent visitors to the marsh, however, have observed an unidentifiable footprint, larger than a man's. . . .

Ms. Rusinski is visual information specialist, SCS, Syracuse, N.Y.

Reclaiming Kaolin Mines in Georgia

by Byron Sanders

Georgia is seldom considered to be an important mineral-producing State. However, it is the Nation's largest producer of kaolin—a fine white clay used for coating high-grade printing paper and in the manufacture of rubber, linoleum, oilcloth, paint, fertilizers, insecticides, and hundreds of other products.

The word kaolin comes from the Chinese *Kaoling,* a mountain in China that produced the first kaolin sent to Europe. Kaolin is still commonly known as China clay.

"When you rub your finger across a sheet of good grade magazine paper," explained John Barton of Theile Kaolin Company, Sandersville, Ga., "the smooth, white surface is all kaolin. Less than 20 percent of the particles on the sheet are bigger than a wisp of smoke."

Barton said that clay is what makes high-speed printing and color reproduction possible today.

About 90 percent of the kaolin mined in the United States comes from an irregular strip of land running across central Georgia into South Carolina. In 1977, about 5 million tons of Georgia kaolin were produced.

Georgia kaolin mining began on a small scale in 1876. Today, the State has 36 kaolin companies and 123 mines.

The Georgia Surface Mined Land Reclamation Program for the rehabilitation of lands affected by mining was initiated on a statewide basis on January 1, 1969. From that date to June 30, 1977, the kaolin surface mining industry mined 9,389 acres of land. Of that amount, 14 percent—or 1,317 acres—has been satisfactorily reclaimed. Of the remainder, thousands of acres have been graded and are awaiting the establishment of permanent vegetative cover or touchup work before being classified as satisfactorily reclaimed. Many of these previously mined areas are now in pastureland and woodland.

In the strip mining process, draglines or scrapers are used to remove the overburden of soil, which varies from 5 to 80 feet deep. The overburden is placed in sites not covering clay beds, or in areas from which clay has previously been mined. This process leaves a final pit to be established into a lake or pond.

The Soil Conservation Service plant materials center in Americus, Ga., made trial plots with different plants to determine the best critical area treatment to stabilize the kaolin mine spoils.

On steeper areas, diversions and terraces with pipe outlets are used to control erosion. The pipe outlets have become an important tool in terracing to direct the water to a lake or protected area below.

Most of the land to be reclaimed is leveled after mining, subsoiled on the contour, smoothed, and planted with rye in the fall. Permanent vegetative cover is planted into the rye in the spring. This method is similar to the conservation tillage or "no-till planting" of row crops into small grain.

A high rate of fertilizer and lime is usually applied when planting the rye—which will grow up to 6-feet tall in a normal year. The rye is then run over with a cultipacker in the spring and seeded to a combination of lovegrass, common bermudagrass, and sericea lespedeza.

Some areas of reclaimed land are being planted to pine trees for timber production after the sericea lespedeza is established. However, the pines will not grow on the infertile subsoil or prevent erosion without an established permanent sod.

The ponds left on the reclaimed area are being stocked with fish and provide excellent habitat for duck and other waterfowl. Where the reclaimed land has been converted into pastureland, the lakes are used for livestock water.

In Washington County, Ga., the 400-acre Hodges Mine has been reclaimed using sericea lespedeza. It has nine lakes. Bill Phillips of Theile Kaolin Company said, "This tract looks so good after reclamation that it is being considered for use as a golf course."

The American Industrial Clay Company—also in Washington County—is using a reclaimed mine as a recreation area for its employees. A 15-acre lake has been stocked with bass and bream, a beach area developed for swimming, and another 5-acre lake stocked with catfish. Tennis courts, a recreation building, and a picnic area have also been built.

The kaolin industry, with technical assistance from SCS, has been a leader in mine reclamation in Georgia and is proud of the productive land that has resulted from its reclamation work.

Mr. Sanders is district conservationist, SCS, Sandersville, Ga.

SCS Helps Build Strong Bodies 13 Ways

by Arthur Cross

It all began in the summer of 1975. Ruth Henderson, wife of well-known pianist and conductor Skitch Henderson, was visiting her father in Welzheim, Germany. While in Germany, she used a "Trim-Yourself Path," a combination running and walking trail which consisted of 15 exercise stations.

The stations—which included chinning bars, parallel bars, balance logs, tarzan rope swing, and horizontal hang ladders—were spaced about 100 yards apart. The entire length of the course, including warmup and cool-down runs, was 1.4 miles.

Henderson was so impressed with the idea that she thought it would be great to have a trim-yourself path in her hometown of New Milford, Conn. She visited the mayor of Welzheim and obtained a copy of the trail's designs and specifications.

Henderson then presented the plan to the Town Park and Recreation Commission, of which she is a member, and to other town officials, who received the idea with enthusiasm. Baldwin Park, a 14-acre undeveloped parcel of town land, was selected as the ideal site. The park's partly open, partly wooded features met the different requirements of the exercise stations, and its proximity to a public school would help to promote its use.

In fall of 1975, Henderson contacted the Litchfield County Soil and Water Conservation District which approved her request for technical assistance from the Soil Conservation Service.

SCS designed the trail and exercise stations to be compatible with the soils, topography, and existing vegetation. After examining the site, SCS staff planned the path and stations in such a way that no living trees were cut down, erosion hazards were minimized, and wet soil areas were avoided. Through careful planning, they were able to preserve a mature stand of hemlock trees. The soil around the hemlocks' surface roots might otherwise have been compacted by the weight of peopie running on or near it.

SCS matched 13 exercise stations to the park's diverse land features. For example, a slalom section zigzags through a cluster of trees growing on gently sloping, well-drained soil. The hang ladder station is located in a long, level, and narrow opening in the woods. And one can swing on a rope from bank to bank of a brook at the outlet of a small wetland where the soils are well drained and firm.

Construction started in the summer of 1977, under the supervision of Joe Fedin, the New Milford park and recreation director. A Comprehensive Employment and Training Act (CETA) crew of four used mostly noncost materials such as discarded telephone poles and odd pieces of pipe. At each station, they posted signs with diagrams and instructions carved into pine. The path was completed in November 1977.

Ruth Henderson's trim-yourself path has achieved countywide popularity and has sparked nationwide interest. She has received many compliments from its users and calls from people out-of-State requesting information on the path. In addition to the students from the neighboring public school, students from other New Milford schools are taking advantage of the exercise area as well.

Henderson said, "The idea is working very well. A lot of families use the path. You might say, it's a way to bridge the generation gap."

Ruth Henderson (foreground) and Nancy Chadwick, Litchfield County Soil and Water Conservation District manager, try out the obstacle section of the Trim-Yourself Path.

Mr. Cross is district conservationist, SCS, Litchfield, Conn.

Keeping Hot Spots Cool

by Roger B. Wiedeburg

Energy conservation is promoted by many gas and oil companies, but one energy company—TENNCO (Tennessee Gas Pipeline)—practices resource conservation, too.

Paul Ramsey, TENNCO right-of-way agent, said, "We have a responsibility to the landowner, the land, wildlife, and the other parts that make up the environment along our pipeline rights-of-way."

This attitude and an appreciation for the environment caused TENNCO to develop a resource conservation plan in eastern Kentucky several years ago. The plan involved hotspot areas within pipeline rights-of-way.

"Our first consideration in developing the plan was to control erosion and prevent the pollution of local streams," Ramsey said. "The means for accomplishing this would be to establish a herbaceous cover for the pipeline's right-of-way that would furnish pasture or hay, thus creating a compatible situation for the underground pipe, the environment, and the landowner."

Ramsey secured permission from one of the landowners along the pipeline near Clay City, Ky., to use 5 acres of land for test plots. The area was divided into six equal parts on which different species of grasses and legumes were planted.

"What makes this area so unusual is that it is predominantly Colyer, an extremely dry and infertile shaly loam soil," said Donald S. Henry, Soil Conservation Service plant materials specialist for Kentucky. "This is an extremely acid, black shale soil that developed from the New Albany Shale formation." The soil is so acid in this area that TENNCO has to keep constant watch for pipe deterioration.

Shaly loam soil is naturally droughty. Abnormally high temperatures aggravate the problem.

Temperatures are greatest (130° F or 54.5° C) near the Westbend Pumping Plant, located 1.3 miles from the test plots. "Close to the Westbend plant a lot of heat is still in the gas, causing the soil to have a proportionately high temperature," Ramsey said.

The plants for the six test plots were secured through the SCS plant materials centers in Kentucky, New York, and New Jersey. Plant materials specialists Donald Henry and Wayne Everett assisted in selecting the plants.

According to Henry, 'Kentucky 31' tall fescue and 'Interstate' sericea lespedeza, which were planted on one of the plots, are being used as a standard for comparison with the other plots. The others contain 'Appalow' prostrate sericea lespedeza and caucasian bluestem; Interstate sericea lespedeza and caucasian bluestem; 'Tioga' deertongue and weeping lovegrass; 'Lathco' flatpea and Kentucky 31 tall fescue; and Kentucky 31 tall fescue seeded alone.

The plots were prepared and the plants seeded April 11, 1977. "After two growing seasons," Henry pointed out, "Appalow sericea lespedeza, Lathco flatpea, and caucasian bluestem are equal to or better than the standard Kentucky 31 fescue and Interstate sericea lespedeza."

TENNCO furnished all the grass and legume seeds that could be purchased locally. The firm also contributed lime, fertilizer, mulch, and all the labor to complete the resource conservation plan. Glen Gilkinson, TENNCO maintenance foreman, assigned Arlis Martin and Lester Roundtree to the project.

Martin prepared the seedbed in the fall by disking in 6 tons of lime per acre. The next spring, 6 more tons of lime per acre and 800 pounds of fertilizer were disked into the soil.

Martin and Roundtree then planted the grass and legume seeds and covered them with a light disking. After planting, the area was mulched with $1^1/_2$ tons of straw per acre, which was held in place with an asphalt base emulsion.

After planting the test plots, the weather turned dry and hot. Coupled with heat generated by super-heated gas in the pipeline, this caused an extreme drought. The mulch shaded, cooled, and prevented excessive moisture losses, helping the grasses and legumes to survive.

With the resource conservation plan, TENNCO not only protected and improved the environment but also realized a side benefit. Before the grass-legume cover was planted, an electronic technician had to carry water to moisten the probe used to check corrosive conditions of the pipes. Now there is enough moisture in the ground naturally to give an electronic reading, even under the very driest weather conditions.

TENNCO and SCS were in agreement from the very beginning about the resource conservation plan.

Ramsey said, "These plantings have more than met my expectations for this area. I knew that if anyone knew how to correct these conditions, it would be SCS."

Mr. Wiedeburg was district conservationist, SCS, Stanton, Ky.

Air Seeding on the Ground

by Jim Hardy

Several of Jim Stock's neighbors nearly ran off the road when they drove by and saw how he was planting small grain on the Mahnomen County, Minn., farm that he runs with his brothers Bob and Jack and brother-in-law Alan Dewey. Not only was he planting right through the trashy stubble of the previous year's crop, but he was also using a planter that blew the seed into the ground rather than pressing it in like conventional planters.

Despite widespread predictions to the contrary, the Stocks' wheat and barley crop came up. Their yields were above the county averages—which were 32 bushels per acre for wheat and 45 bushels per acre for barley—and their crops were as good as any others in the area.

That was 2 years ago. Some of the neighbors are still a little skeptical, but the Stock brothers are convinced now that the air seeder is the only way to go—not only for erosion control, which was their primary reason for going to this conservation tillage system, but also for controlling weeds, saving time and maintenance, and conserving fuel. They figure they've cut their fuel consumption by 25 percent.

They are so satisfied with the system that they are using the air seeder for planting all of their wheat and barley and, in 1979, they planted 90 acres of sunflowers that way as well.

The seeder, designed by a farmer in Canada, has only been on the farm equipment market for about 3 years. It is used more in Canada than in the United States, although farmers in Montana, North Dakota, and northwestern Minnesota are beginning to use it.

The Stocks saw the air seeder displayed at a farm show and decided to try it. "The main reason we bought it was to start a minimum tillage operation in grain," Jim Stock said.

The air seeder attaches to a field cultivator and blows the seed through hoses into the ground. A harrow attaches to the field cultivator to level the seedbed. The Stocks also apply liquid fertilizer in the same operation.

The Stocks originally had a 60-bushel unit and have since replaced it with a 120-bushel unit on a 38-foot cultivator to speed up the seeding operation.

Before the Stocks bought their air seeder and started their conservation tillage system, they operated like many farmers in their area—plowing with a moldboard plow in the fall, cultivating once in the fall, cultivating once or twice in the spring, dragging the field, seeding, and dragging once more for good measure.

"We have eliminated plowing, two cultivations, and a harrow operation," Jim said. "This has greatly speeded up our seeding time and reduced fuel consumption, along with leaving more crop residue on the soil surface after planting. We have also found that the air seeder requires less maintenance than the press drill.

"Some of the neighbors are a bit skeptical of our seedbed preparation," Jim said, "because we aren't disking, cultivating, and dragging our fields before planting."

He believes their seedbed preparation is adequate, though. "The proof is in the bin," Jim continued. "Our crop yields with the air seeder have shown that all those previous operations are not necessary for a good seedbed."

It's too early to say the Stocks have started a new fad with their air seeding, but one of their neighbors, Sylvester Spaeth, now has an air seeder too.

"I bought the air seeder after seeing the Stocks operate theirs," Spaeth said. "I thought it was much better than a press drill because it saved time with fewer trips over the field to get the field ready for planting. I don't have a serious erosion problem, but what I do have will be reduced."

According to Spaeth, the air seeder has the potential of becoming the seeder of the future.

Jim Stock (left) and Jim Hardy, SCS district conservationist, discuss seedbed preparation using the air seeder which attaches to Stock's cultivator

Mr. Hardy is district conservationist, SCS, Mahnomen, Minn.

Rye From the Sky

by Dick Lehnert

Farmers in Michigan's Leelanau County—normally conservation minded because of their hilly, wind-blown, sandy soils—are trying a new tool they hope will make their land less erosive and more productive at the same time.

The "hot" new tool is aerial seeding of rye cover crops, mostly into standing corn. The aerial rye seeding program is largely the brainchild of Soil Conservation Service District Conservationist Bernie Huetter. Huetter, like a modern-day Moses, has a real knack for calling manna down from heaven. His manna is "rye from the sky," food for the soil.

"Basically," said Huetter, "we're looking for three benefits: winter cover on corn land to control erosion, especially that chopped for corn silage; ground cover during harvest operations to provide good footing for equipment; and weed suppression next year. Rye competes very well against weeds."

Also important is organic matter. Leelanau County's soils, while variable, tend to be sandy, even gravelly. They're low in organic matter and like sieves when it comes to holding water. While the soil is light and often droughty, it's a resource that needs protection.

Years ago, Leelanau farmers were won over to contour stripcropping. The strips and small fields don't make aerial seeding of rye nearly as easy as where fields are bigger. Huetter doesn't expect the new practice to replace stripcropping, which is deeply ingrained in the county. But, he says, "There's a lot of land in the county that is not well managed with strips or any other conservation practice."

Huetter wanted me to see aerial rye seeding firsthand. While we waited for the airplane, we visited farmers in the area.

Jerry Kelenske of Cedar, a typical Leelanau Soil Conservation District cooperator, has been farming on his own 3 years. "When I bought the farm, it was from an estate and was just in grass," Kelenske said. "It had been in strips, but I decided to try for bigger fields."

He quickly found the land just too sandy and rolling. But rather than go back to strips, he decided to try new techniques. Last year he put in his first 30 acres of rye in standing corn.

From the Kelenske farm, Huetter and I dashed north to Julius Kolarik's farm in Northport. Kolarik, Leelanau Soil Conservation District chairperson, was getting wheat together to seed, instead of rye. Huetter explained that the livestock farmers try to use what they have rather than buy seed, so farmers with wheat use wheat.

We finally met up with the pilot, Ed Knapp. The plane was at the airport waiting for parts for the aerial rye seeder.

Knapp's company makes its way by spraying fungicides, insecticides, and vine killers on upper Michigan's potato fields. Knapp considered rye seeding a "piece of cake" compared to Upper Peninsula flying where he flies at 130 knots 15 inches above potato fields. "We often come back with vines on the wheels," he said. "Fifty feet up for rye is a more reasonable altitude."

The plane held 1,500 pounds of clean rye, enough for about 13 acres at 2 bushels per acre. Rye is emitted through a gate box into a spreader that drops a neat 50-foot swatch. Special marker flags are dropped by the plane so no ground workers or prior flag arrangements are needed.

The parts for the plane finally arrived and when the wind dropped about 5:30 p.m., Ed Knapp hit the air, the plane loaded with the rye. As the sun was setting, pilot Ed Knapp made the final pass over farmer Elmer Kalchik's 70 acres of corn. Waiting atop his dairy barn, I looked down and out across Kalchik's corn and his cherry orchards to Lake Michigan in the distance.

Then the plane came. Closer, closer, until snap went the shutter and I had a photo. Is it scary watching a plane come right at you? You bet! Through a telephoto lens, the urge is to duck. But knowing there were three tall silos behind me was reassuring. I knew he would have to pull up or risk making an even more dramatic picture for the local newspaper.

Mr. Lehnert is editor, *Michigan Farmer*, Lansing, Mich.

Adapted from an article in the October 7, 1978, issue of *Michigan Farmer*.

Back to the Hills

by Gene Warren

There was a time when hill farming in Louisiana was as common as sand at the beach. In the 1930's through the 1950's, almost any hillside had a cotton and corn patch on it. But in the sixties and seventies, most hill farms were planted to bahiagrass, coastal bermudagrass, and loblolly pine trees.

Lately, increasing interest in soybeans has renewed farmers' interest in planting the hill land in row crops. One reason is that choice bottomland is hard to find, and high profits from beans lure many farmers to land that is open and able to be plowed.

The Soil Conservation Service estimates that more than 75,000 acres of Louisiana hill land is now in soybeans. Slope on the hill land ranges from 2 to 4 percent, and erosion is a real problem when the land is taken out of grass.

Elbie Crooks and his son, Clyde, have gone from crops to cows and back to crops on their 40-acre farm in LaSalle Parish. But they are using a trick or two to control erosion on their sloping, 20-acre bean field.

"I bought this place back in the early 1950's," said Crooks. "The Soil Conservation Service had helped the original owner build terraces on the sloping land, so I farmed the fields for years without any erosion problems." Crooks quit row farming in the sixties, seeded the land to bahiagrass, and bought a small herd of cows. But one thing he didn't do was plow down his terraces like many other hill farmers did who had also switched from crops to grass.

"Last year I decided to sell my cows and let my son, Clyde, try his hand at growing beans," Crooks said. "All we had to do was to work up the old terraces, and they were as good as new." Clyde teaches math at Jena High School and farms the bean crop in his spare time. "Sure, it's a little harder to work the field when you have to follow the terraces around the slope," he said. "I even wound up with a few short rows because they are all on the contour with the terraces. But the way I figure it, without the terraces, most of Dad's soil would be down in his pond."

Clyde Crooks inspects his old terrace system used to control erosion on a soybean field.

Crooks uses a two-row tractor to farm the land and is quick to point out that it wouldn't be as easy to farm the terraced land with larger equipment.

Kenneth Graham, district conservationist for SCS at Jena, said that other farmers converting sloping grassland to beans should follow Elbie and Clyde Crooks' good example. "SCS can help farmers check the old terrace systems and even design new systems if the old ones are gone," said Graham.

The Crookses use other conservation practices besides the terraces. All their land that is not in beans, sweet potatoes, or field peas is in bahiagrass. Crooks said that he left the land in grass to protect the fine sandy loam soil from erosion.

Each year he cuts the grass and sells it as hay. Most of the potatoes and peas he harvests are sold at the house. "People learn that I have stuff to sell and come by to buy it as fast as I can pick it," said Crooks.

It is not uncommon to lose 10 to 20 tons of soil per acre from erosion each year if sloping fields are not protected by terraces or other conservation measures. Elbie and Clyde Crooks have learned that with a little planning many Louisiana hill farmers can revive their old terrace systems and put them back to work, saving the soil.

Mr. Warren is public information officer, SCS, Alexandria, La.

North Carolina Soils Selected for Global Museum

by Darwin L. Newton
and Frank Jeter, Jr.

Two agricultural soils from North Carolina—Cecil sandy loam and Norfolk loamy sand—have been selected as representative American soils for the International Soils Museum in The Netherlands.

North Carolina is the only Southern State sending soil profiles to the museum, which is collecting benchmark soils from every continent. So far, some 350 soil monoliths from 30 different nations have been accumulated.

In the initial sampling, the United States will provide 15 soils from 10 States besides North Carolina. Other States contributing soils are Indiana, Illinois, Iowa, Nebraska, North Dakota, South Dakota, Minnesota, Arizona, Colorado, and Wyoming.

The Cecil sandy loam being flown to the museum comes from Catawba County. The Norfolk loamy sand is from Robeson County.

The International Soils Museum, which opened in the spring of 1979, was first conceived by the International Soil Science Society. It was built at Wageningen, The Netherlands, with financial assistance from the United Nations Educational, Scientific, and Cultural Organization and the Dutch Government.

Monoliths of each soil will be on public display at the museum. Each monolith is encased in a special wooden container, approximately 1 foot wide and 5 feet long, with a profile that shows how the soil would look in its natural locale, from ground surface to a depth of 5 feet.

In addition, 5-pound samples of each horizon of these soils will be sent to the museum for physical and chemical analysis. These data will be available to scientists and others visiting the International Soils Museum.

Cecil sandy loam is the predominant agricultural soil in the Piedmont area of North Carolina. It is well suited to producing all types of row crops. Forests also grow well in this soil. Cecil is classified as a clayey, kaolinitic, thermic Typic Hapludult.

Norfolk loamy sand is a prevalent soil in the Coastal Plains of North Carolina. It is an excellent agricultural soil, used mainly to grow tobacco, corn, soybeans, and vegetable crops. Norfolk is classified as a fine loamy, siliceous, thermic Typic Paleudult.

"Since the museum has exacting standards for the soils that will be included in this global endeavor, we're very pleased that North Carolina was picked to provide two kinds of soil," said Jesse Hicks, Soil Conservation Service State Conservationist in North Carolina.

The museum is expected to attract soil scientists and related specialists from all parts of the world.

Mr. Newton is assistant State soil scientist, SCS, Raleigh, N.C.
Mr. Jeter is public information officer, SCS, Raleigh, N.C.

With its soil strata looking exactly as they would in their natural location, this sample of Norfolk loamy sand is packed in a wooden container for shipment to the International Soils Museum. Soil Scientist Darwin Newton prepares to load the profile into a station wagon.

New Publications

Sources of Native Seeds and Plants

by the Soil Conservation Society of America (SCSA)

This publication lists hard-to-find sources of native seed and plant materials and companies and organizations that have native seeds and plants available for sale, retail and wholesale.

Native plants have often been overlooked and exotic species have been introduced to areas where they were not adapted and where they did little to maintain the land's productivity. Now the benefits of native plant materials are more completely understood. Recently there has been an increase in the use of native plants that require little or no maintenance and provide pleasing esthetic properties.

However, sources of these native materials have been scarce. Recognizing this, SCSA over the years has maintained a listing of these sources. This latest, updated version includes some 167 sources of native materials, including wildflower seeds, native grass seed, native tree and shrub seed, and native tree and shrub plant stock. The listing does not constitute an endorsement of the firms by SCSA but merely is a list of firms dealing in these hard-to-find native seeds and plants.

Single copies of the 20-page publication are available for $2; 10 or more copies are $1.50 each. Orders should be directed to the Soil Conservation Society of America, 7515 N.E. Ankeny Road, Ankeny, Iowa 50021.

Proceedings of the First International Rangeland Congress

by the Society for Range Management

The first of its kind, the International Rangeland Congress was sponsored by the Society for Range Management in August 1978 in Denver. Its purpose was to help range managers gain a better understanding of worldwide rangelands, and to give rangeland users the benefit of the range profession's combined international expertise.

The proceedings is a collection of more than 200 invited and volunteer papers by authors from more than 39 countries. The papers address the following subjects: (1) Social, political, and economic systems that enhance application of rangeland management and development practices; (2) multiple benefits from rangeland, including grazing animals, food and fiber for humans, recreation and tourist income, and vegetation for cover for critical wetlands; and (3) descriptions and classifications of worldwide rangeland ecosystems.

The proceedings also contains author and general indexes, original illustrations, photographs, charts and graphs, and bibliographical material.

With 724 pages bound in hard cover, this volume makes an invaluable reference for a private or institutional library. Copies are available for $60 from the Society for Range Management, 2760 West Fifth Avenue, Denver, Colo. 80204.

Help Yourself

by the U.S. Army Corps of Engineers North Central Division

This pamphlet provides property owners with an information guide for protecting the Great Lakes shoreline from damage due to erosion. The U.S. Army Corps of Engineers compiled and revised these data in cooperation with the Great Lakes States.

The pamphlet progresses from understanding shore erosion, to planning considerations for erosion control, to selecting a type of shore protection. Its 24 pages are illustrated with photos, maps, charts, and diagrams.

Several shore protection designs and costs are presented, with discussion of construction and maintenance guidelines, standard designs, and sample specifications. The pamphlet also includes information on how to initiate and organize community action on shore protection measures, a section accompanied by photographs on demonstration research projects, and a glossary of terms.

The installation of shore protection measures usually requires the services of a consultant to develop the final design necessary for a Corps permit.

Copies are available from the North Central Division, U.S. Army Corps of Engineers, 536 S. Clark Street, Chicago, Ill. 60605. Copies were distributed to Soil Conservation Service State offices on August 20, 1979, under National Engineering Bulletin No. 40-9-44.

News Briefs

More on Wind-Powered Irrigation Pumps

A news brief in the October 1979 issue of *Soil Conservation* discussed the U.S. Department of Agriculture's (USDA) research on using wind as an alternative source of energy for pumping irrigation wells. USDA's Science and Education Administration (SEA) has found another use for wind in irrigation pumping.

The Great Plains covers almost half of the irrigated lands in the United States. About 15 percent of the irrigation water for the Great Plains is being pumped from surface sources. SEA Researcher Lawrence Hagen and Kansas State University Research Assistant Muhammed Sharif have developed a way to use the wind to pump water from the surface sources.

Hagen and Sharif have devised a system of low-lift irrigation pumping for reusing the irrigation water which "runs off" the fields and collects in tailwater pits.

They have designed and tested a Darrieus vertical-axis wind turbine which is mechanically coupled to a vertical turbine pump. The wind turbine is eggbeater shaped with two aluminum airfoil blades. It is 20 feet in diameter, 30 feet tall, and is mounted on an 8 1/4-foot tower.

The wind-powered turbine pumps the unused irrigation water into a small reservoir at the head of the field. The reservoir then supplies the water to a gated pipe irrigation system. This irrigation pumping system is especially adaptable to those areas where electricity or natural gas commonly used for pumping irrigation water is not available.

USDA's research findings on wind-powered irrigation pumping are a promising source of relief to Great Plains irrigation farmers.

Meetings:

January	
3–8	American Association for the Advancement of Science, San Francisco, Calif.
6–10	American Farm Bureau Federation, Phoenix, Ariz.
7–11	North American Game Breeders and Shooting Preserve Association, Orlando, Fla
13–14	Land and Water Conservation Exposition, Des Moines, Iowa
17–21	National Wool Growers Association, San Diego, Calif.
21–25	National Cattlemen's Association, San Diego, Calif.
February	
10–14	National Association of Conservation Districts Convention, Houston, Tex.
11–15	Society for Range Management, San Diego, Calif.
15–18	American Association of School Administrators, Anaheim, Calif.
20–23	Land Improvement Contractors of America, Phoenix, Ariz.
23–27	The Irrigation Association Technical Conference, Houston, Tex.
March	
9–14	The American Society of Photogrammetry, St. Louis, Mo.
16–18	American Pulpwood Association, New Orleans, La.

Small Farm Assistance Program

The U.S. Department of Agriculture (USDA), the Community Services Administration (CSA), and ACTION—the parent body of VISTA and the Peace Corps—are coordinating their resources to help small farm operators improve their quality of life through pilot small farm assistance projects.

Seventeen projects have been selected to demonstrate the coordinated efforts of USDA, CSA, and ACTION in solving the problems of small farm operators and their families. Farmers in the project areas will receive increased technical and financial assistance in solving their conservation problems and in making the most of opportunities to improve their farm management and marketing skills and improve their standard of living.

Projects include increasing family income on small farms in Winston County, Miss., and improving farm family skills for both farm and nonfarm employment; increasing the family income on 50 small farms in Charles Mix County, S. Dak., through an intensive farm family resource management program; and helping 500 farmers in the Upper Pocatalico watershed in West Virginia control erosion and pollution problems that are lowering farm productivity.

The USDA agencies involved in the projects are the Science and Education Administration-Extension Service; Farmers Home Administration; Forest Service; Soil Conservation Service; Agricultural Stabilization and Conservation Service; and the Economics, Statistics, and Cooperatives Service.

Small farm assistance projects have been approved in Alabama, Colorado, Georgia, Hawaii, Kentucky, Louisiana, Maine, Mississippi, Missouri, Nebraska, Nevada, New Mexico, Oklahoma, Oregon, Rhode Island, South Dakota, and West Virginia.

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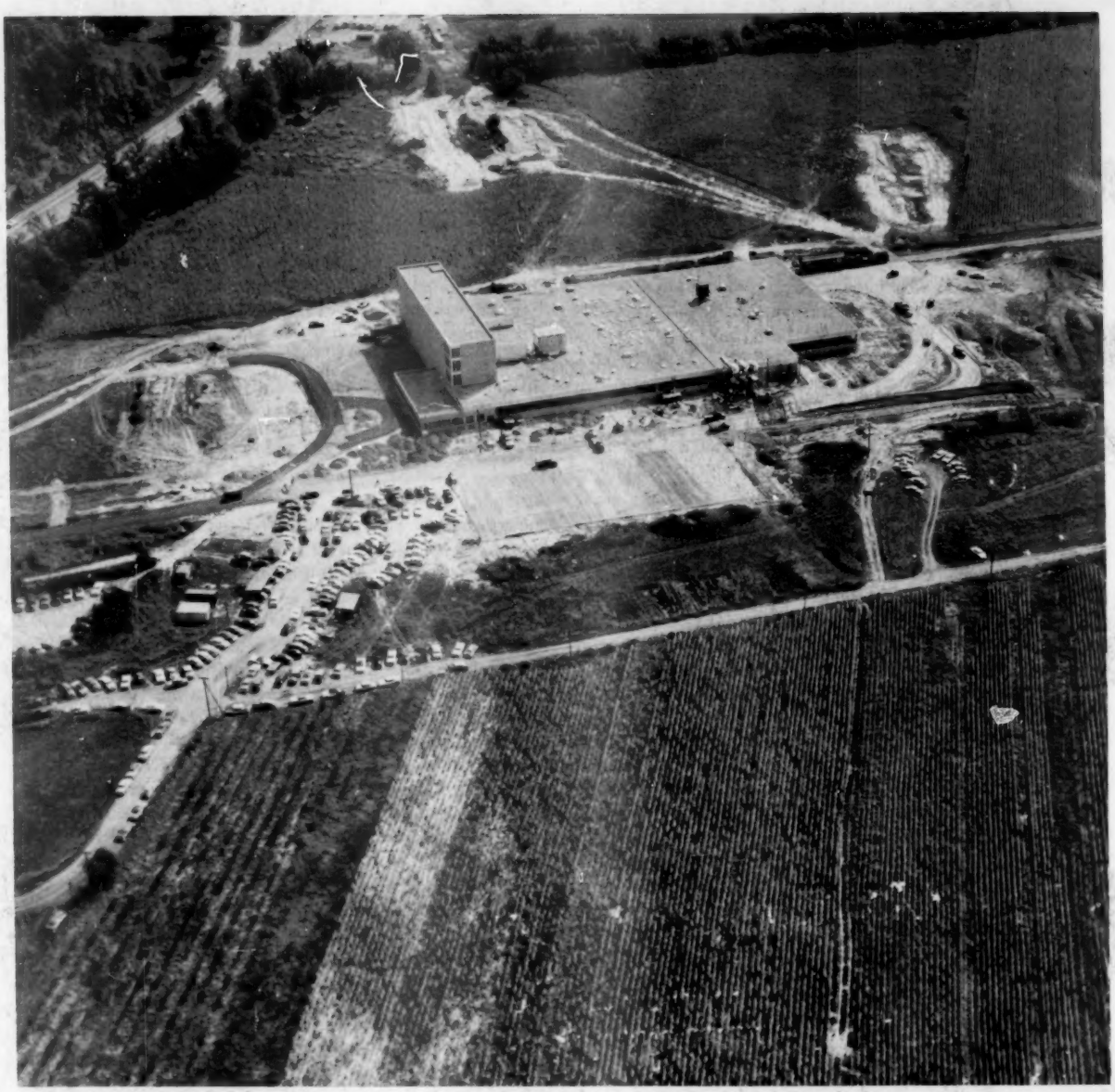
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